

# Importance of Municipal Solid Waste Management

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**Abstract**—Solid waste management is one among the fundamental and essential services provided by municipal authorities in the developed as well as developing countries to keep urban areas clean. In certain regions of our country, the free disposal facilities have reached their own capacity and even local governments are confronted with difficult decisions. Solid waste management is an integral element of modern society. There are many ways in which solid waste can be treated, and thanks to modernized practices and technological advancement, these methods are very safe and practical.

**Keywords**—Solid Waste Management, Intelligent technique.

## I. INTRODUCTION

Solid waste management is one among the fundamental and essential services provided by municipal authorities in the country to keep urban centers clean. Solid waste management has always been a serious problem for cities throughout the world. It is not different in developing countries like India. In certain regions of our country, the free disposal facilities have reached their own capacity and even local governments are confronted with difficult decisions. Modern civilization has brought a lot of luxuries and conveniences to our lives. However, with all of the amenities that modern life brings us, they also cause us to contribute to producing a large quantity of trash that needs to be taken care of. Fortunately, there's the field of solid waste management, and it is with that Solid Waste Management that modern lives are enjoyable without the disturbance or refuse. Solid waste management is an integral element of modern society. Even if we don't get to see what goes on at the facilities and plants that process and dispose of garbage, it still contributes to the well-being of our lives. There are many ways in which solid waste can be treated, and thanks to modernized practices and technological advancement, these methods are very safe and practical. For example, in our previous research works, we have applied several intelligent techniques like graph theory, ant colony optimization, shortest path algorithm, image processing and other intelligent techniques [1,2,3,4,5,7,8,9,10,11,12,13,14,15,16]. In some cases the existing garbage collection pathways were considered and it was shown that if such intelligent

techniques are applied then the cost involved in collecting the garbage will be significantly decreased. Besides that we have also applied image processing technique for reorientation of garbage collection points in several municipal areas of West Bengal.

## II. MATERIALS & METHODS

In our present study we mainly confine our views on importance of solid waste management. It is because this is now burning issues and most of the countries both developed and developing countries of the world concentrate on that. We have already studied solid waste management issue on several municipal areas of West Bengal, India of which some municipal areas belong to oldest city of India and some areas belong to most advanced i.e. satellite city of India. After that we have noticed the following:

- The poor quality of the services provided in terms of solid waste collection and disposal is the issues of concern.
- To provide a waste management service this can be acceptable on existing financial constraints.
- There is lack of action plan for proposing and implementing an efficient Management Information System (MIS) & Geographical Information System (GIS)
- The provision of planning and management such that there are possibilities of improvement in financial and institutional support.

Due to the financial constraints it was suggested to incorporate those options which can promote the improvement in the system without a major capital investment. So it is proposed to create the MIS and GIS information. According to Ogra, A, 2003 [6], "Municipal bodies are unable to prove a 100% efficient system and even are not able to reach the efficiency of 60%". This is not because the municipality is not doing their work properly or due to work negligence, but it is due to the old conventional working methods which need to be upgraded with the advanced system like GIS and a better management system. The data should be managed in an integrated way to reduce the complexity of different issues related to the function of the work involved in the waste management system. We have noticed that the solid waste

management in several municipal areas appears to be inadequate and needs up gradation. The solid waste has to be disposed off scientifically through sanitary landfill and recyclable portion of the waste should be salvaged. Segregation of recyclable material would also lead to reduction in quantity of solid waste for final disposal. Higher priority needs to be assigned to the management of municipal solid waste by the local authority and a system approach needs to be adopted for optimizing the entire operation of SWM encompassing segregation at source, timely and proper collection, transportation routes and types of vehicles and development and proper operation of sanitary landfill site. The density of population along with number of offices and institutions are continuously increasing thus there should be effective management activity for managing the solid waste which is generated daily in these municipal areas. On the other side the municipal authorities had their reasons for this mismanaged of the waste maintenance as follows:

- The citizens do not throw the waste inside the bins so it often lies outside and around the bins, making the area around the bin look dirty.
- The waste lifting capacity is quite less in comparison with the amount of waste generated in the city.
- There is also a shortage of manpower, equipment and machinery.
- Other problems due to poor SWM Now the situation was such that there were several drawbacks of this garbage accumulation and even worse were its consequences, some of them are:
  - (i) Bad odour is created around the garbage area, making an unbearable environment.
  - (ii) Poor waste pickers pose a serious threat to public health.
  - (iii) Animals like cats, dogs, goats and cows come to the garbage in search of food and end up in spreading the garbage around the bins.
  - (iv) The economic factor is also affected, the market value of a particular area decreases if there is a badly maintained waste area near by as it poses a bad aesthetics.
  - (v) It overall leaves a bad impression and poses a threat to the environment
  - (vi) Waste bins are not properly distributed; the waste bins of several areas of all municipal areas considered in this study are not uniformly distributed. Moreover some wards or blocks share the waste bins of adjacent wards/blocks.
  - (vii) Distance between waste bins varies in great extent; it is found that generally in each block/ward only one dustbin is present. The area of each block/ward varies greatly. Thus in several cases it is found that the distance

between waste bins located in adjacent blocks/wards considerably large.

- (viii) There is no proper justification regarding waste generation and number of waste bin in a particular area; it is because huge garbage production areas contain few numbers of waste bins.
- (ix) For effective SWM, both GIS & MIS data should be implemented; by applying this concept the waste generation map can be constructed which is essential for justifying existing waste bins locations and optimizing the garbage collection pathways.

### III. CONCLUSION

In the conclusion it has been discussed about the reformation in the concepts of the data management and the analysis carried with the help of GIS. Once the waste management department is aware of the total function of the GIS system, it will get acquainted with its effectiveness. Then there will be an entire record of all the things related to the waste management and suitable logistic management and spatial planning can be achieved. This can be done with the help of GIS analysis on the different layers for practical implementations. By applying the functions like overlaying, applying buffer for proximity analysis or by applying queries through a structured query language (SQL) the required information can be extracted.

- Demographic map can be used to know the more waste generating areas.
- The category of waste like domestic, industrial, commercial etc. can be found out easily with the help of the land use map.
- Existing location of the waste bins and the street maps will provide the proximity of the bins to the waste collection service routes. In case of any inconveniency for the waste collecting crew the bins can be re located.
- A map showing the current waste generated and the waste generated in different wards, sectors and along the roads, streets and junctions. These above enlisted points are said to be an important exercise to begin with. The points overall covers many waste management issues, but they are very generalize and require a lot of data and proper analysis using the GIS software. There will be a requirement to develop several models to apply all those points on the real time data.

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